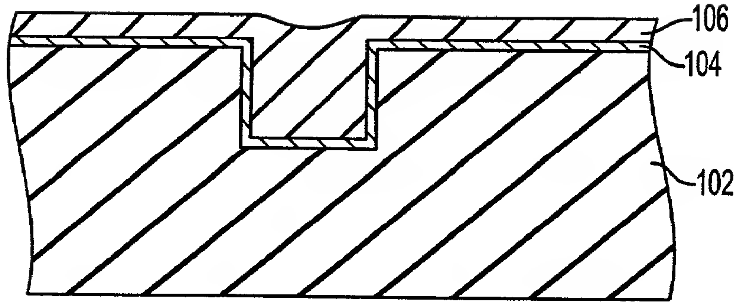


FIG. 1A
(PRIOR ART)

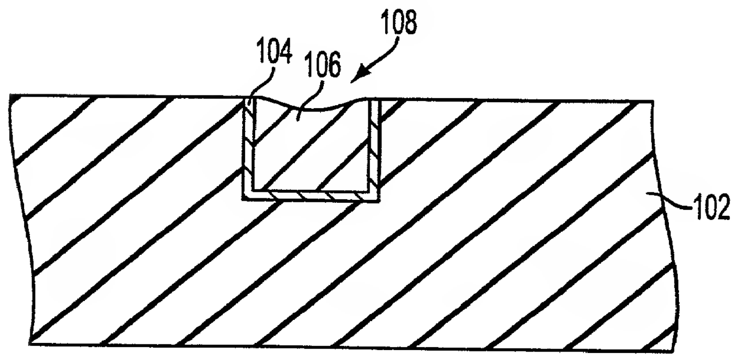


FIG. 1B
(PRIOR ART)

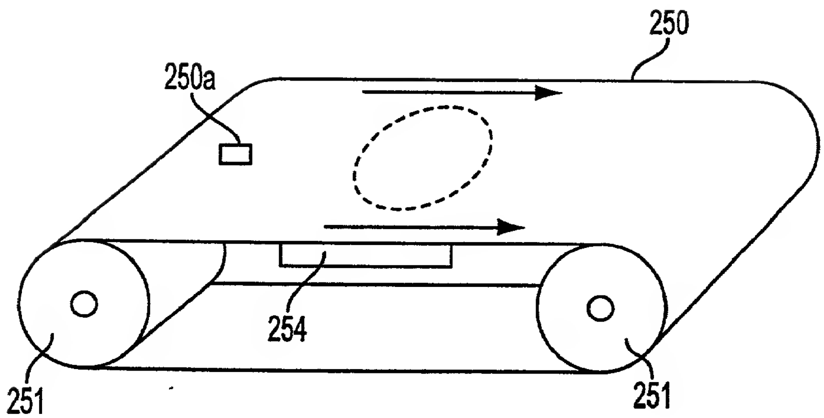


FIG. 2A

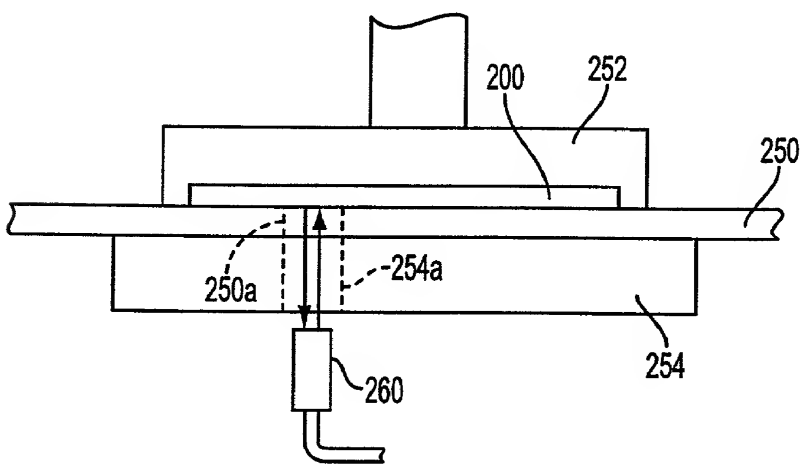


FIG. 2B

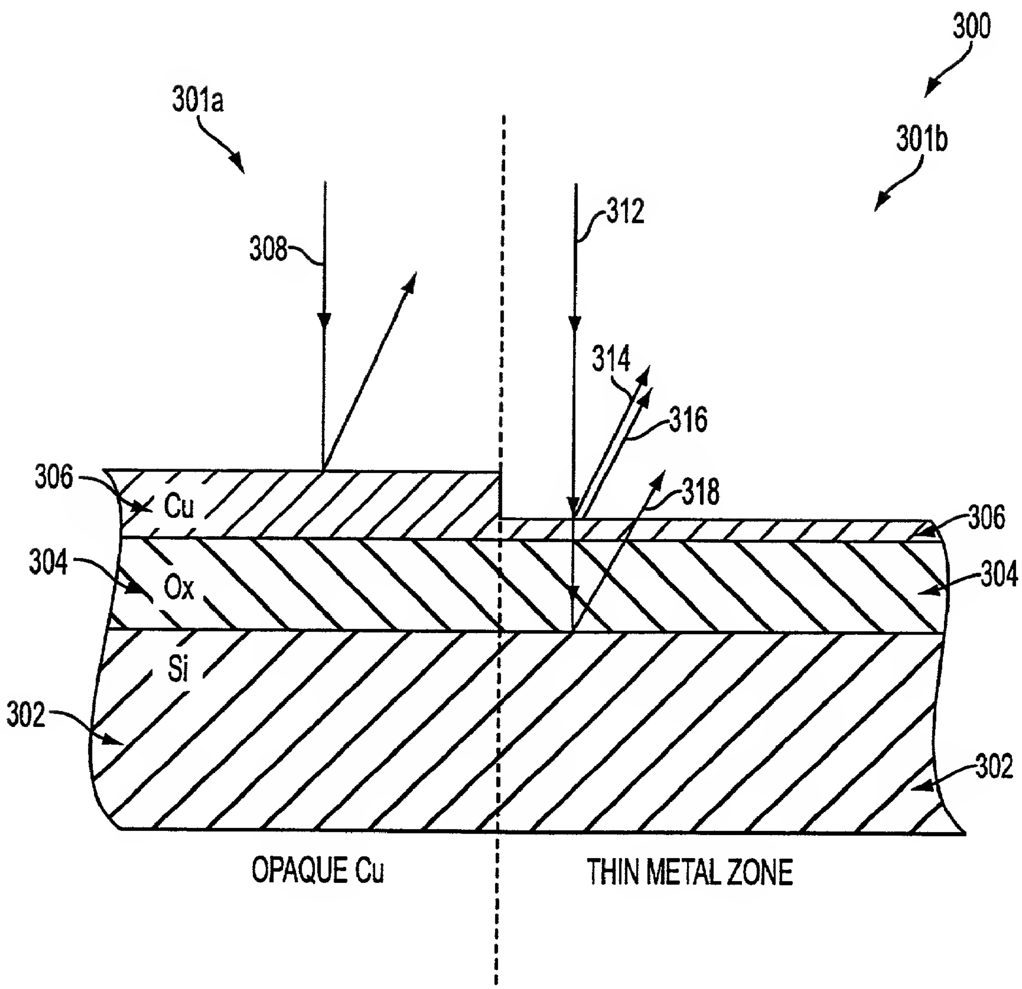
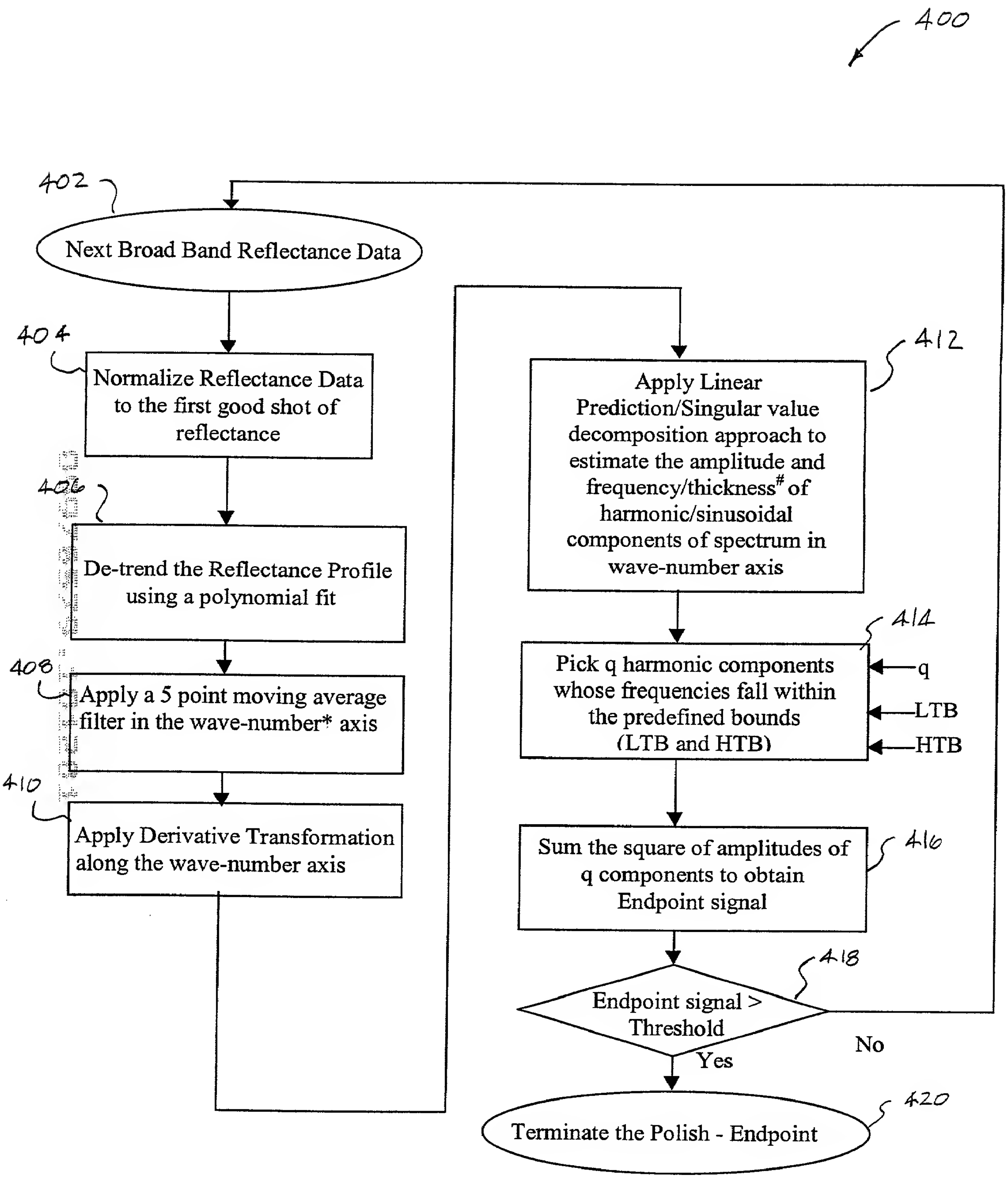

300
301a
301b
308
312
314
316
318
306
Cu
304
Ox
Si
302
306
304
302
OPAQUE Cu
THIN METAL ZONE

FIG. 3



*Wave-number = 1/lambda

Frequency and Thickness are equivalent

FIG. 4

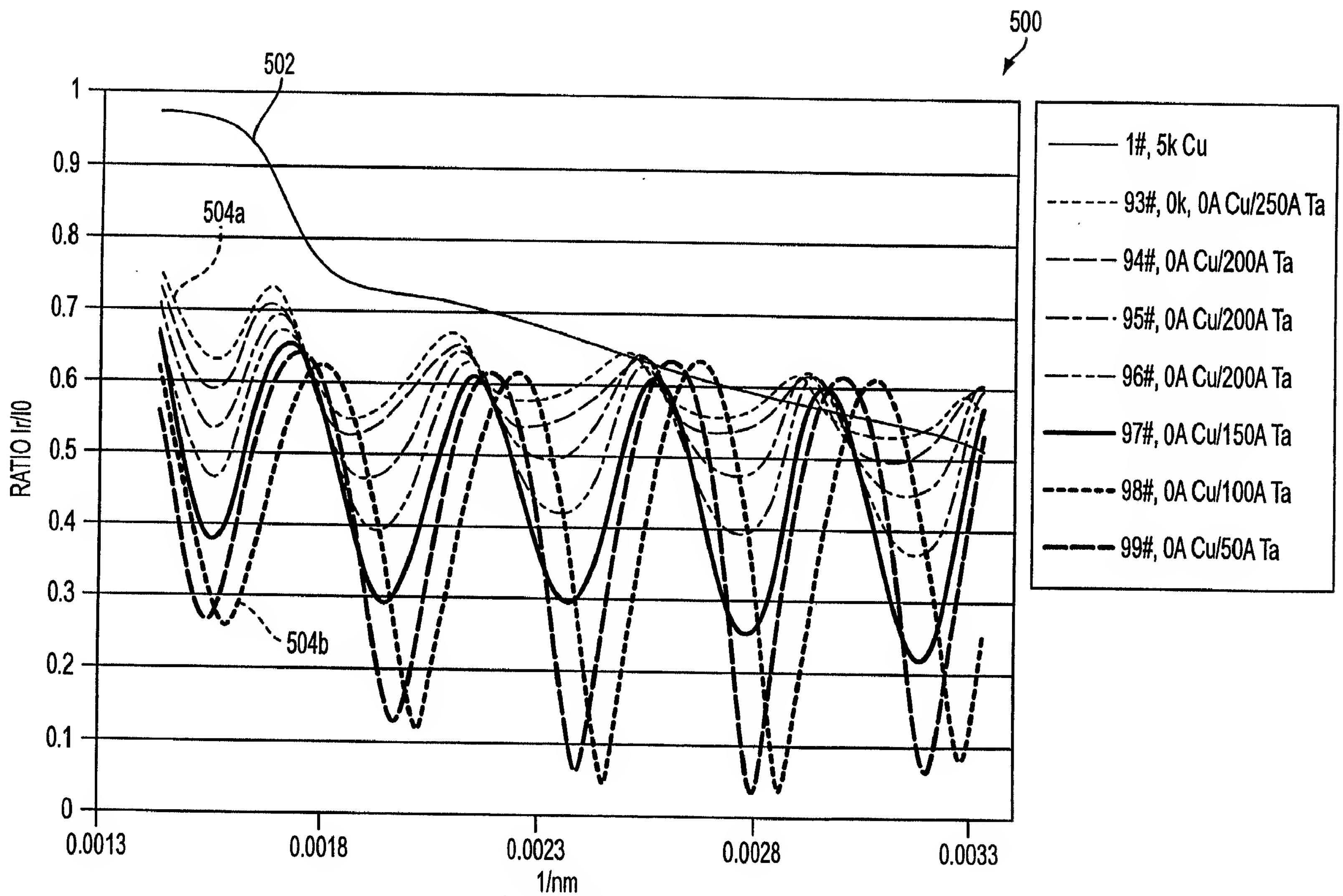

500
502
504a
504b
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
RATIO Ir/I0
0.0013
0.0018
0.0023
0.0028
0.0033
1/nm
1#, 5k Cu
93#, 0k, 0A Cu/250A Ta
94#, 0A Cu/200A Ta
95#, 0A Cu/200A Ta
96#, 0A Cu/200A Ta
97#, 0A Cu/150A Ta
98#, 0A Cu/100A Ta
99#, 0A Cu/50A Ta

FIG. 5

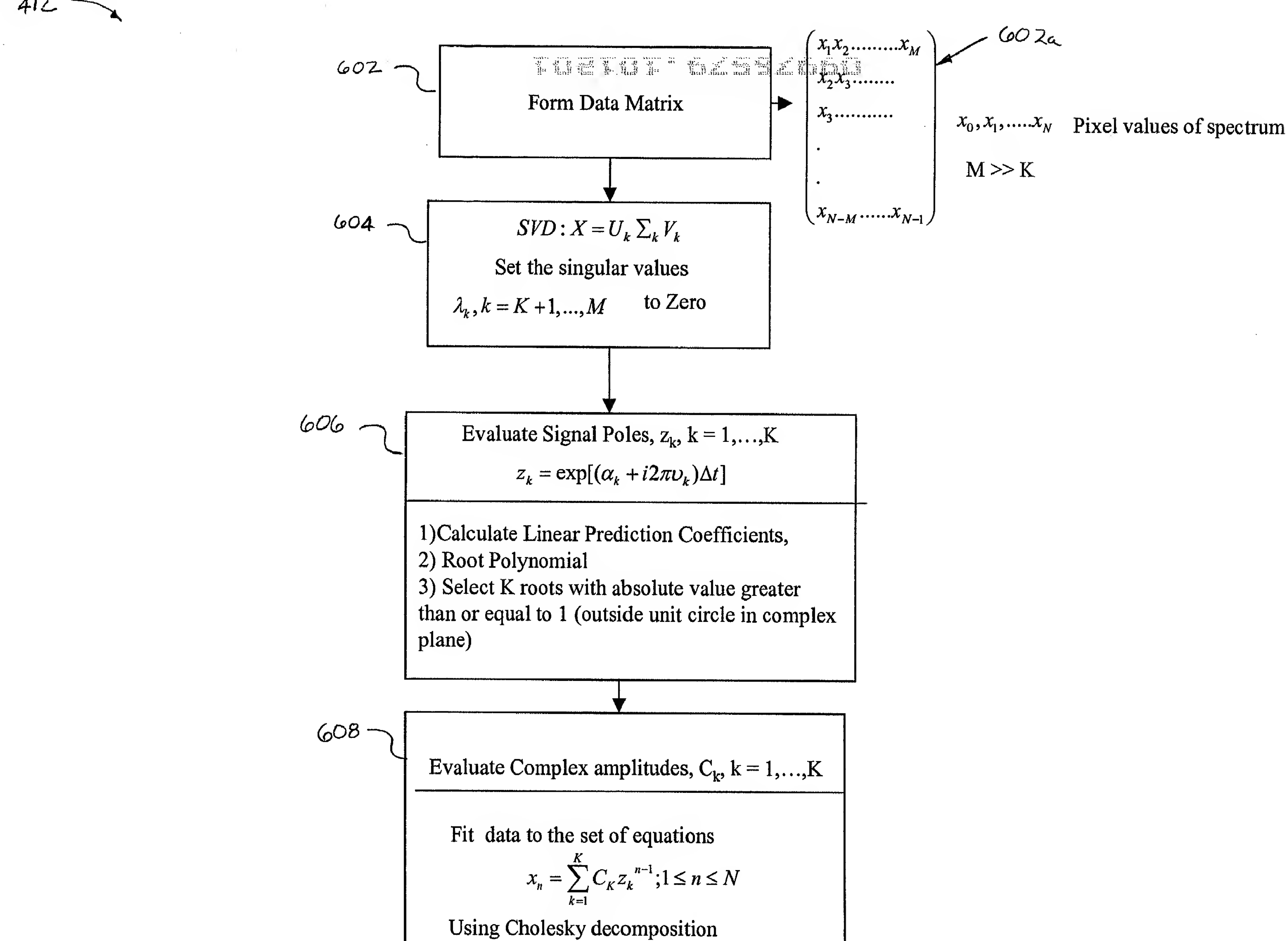
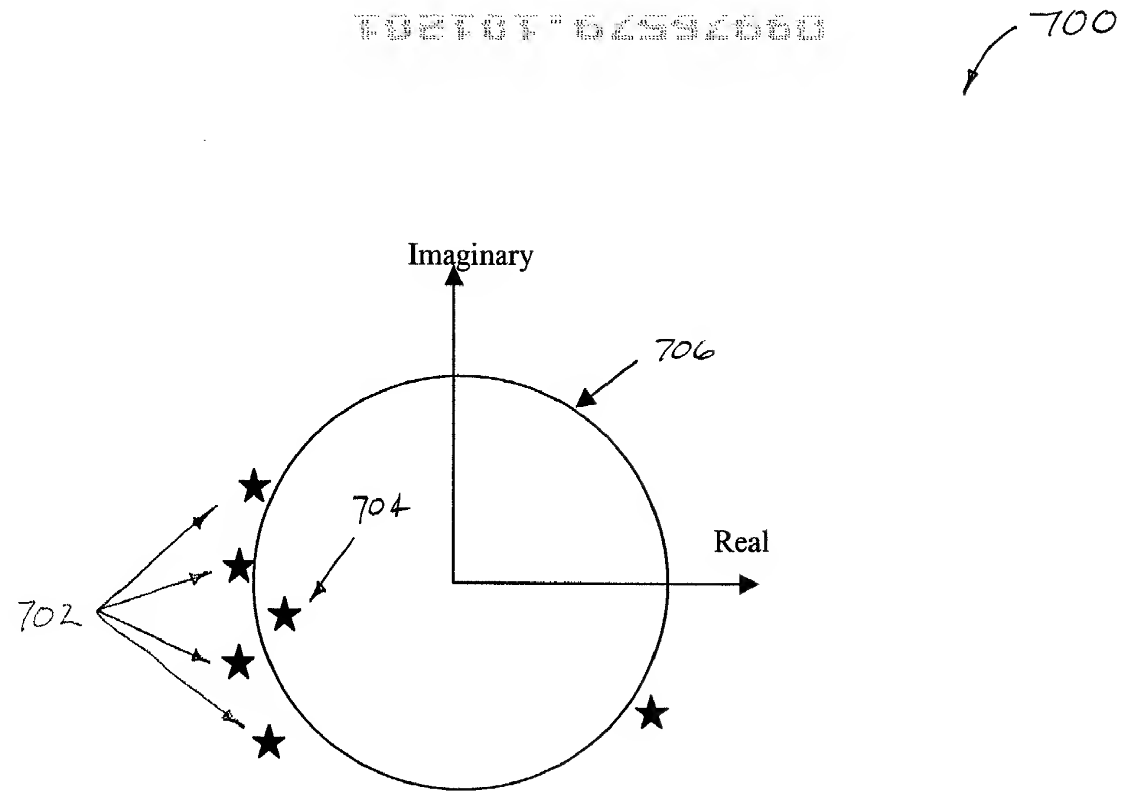
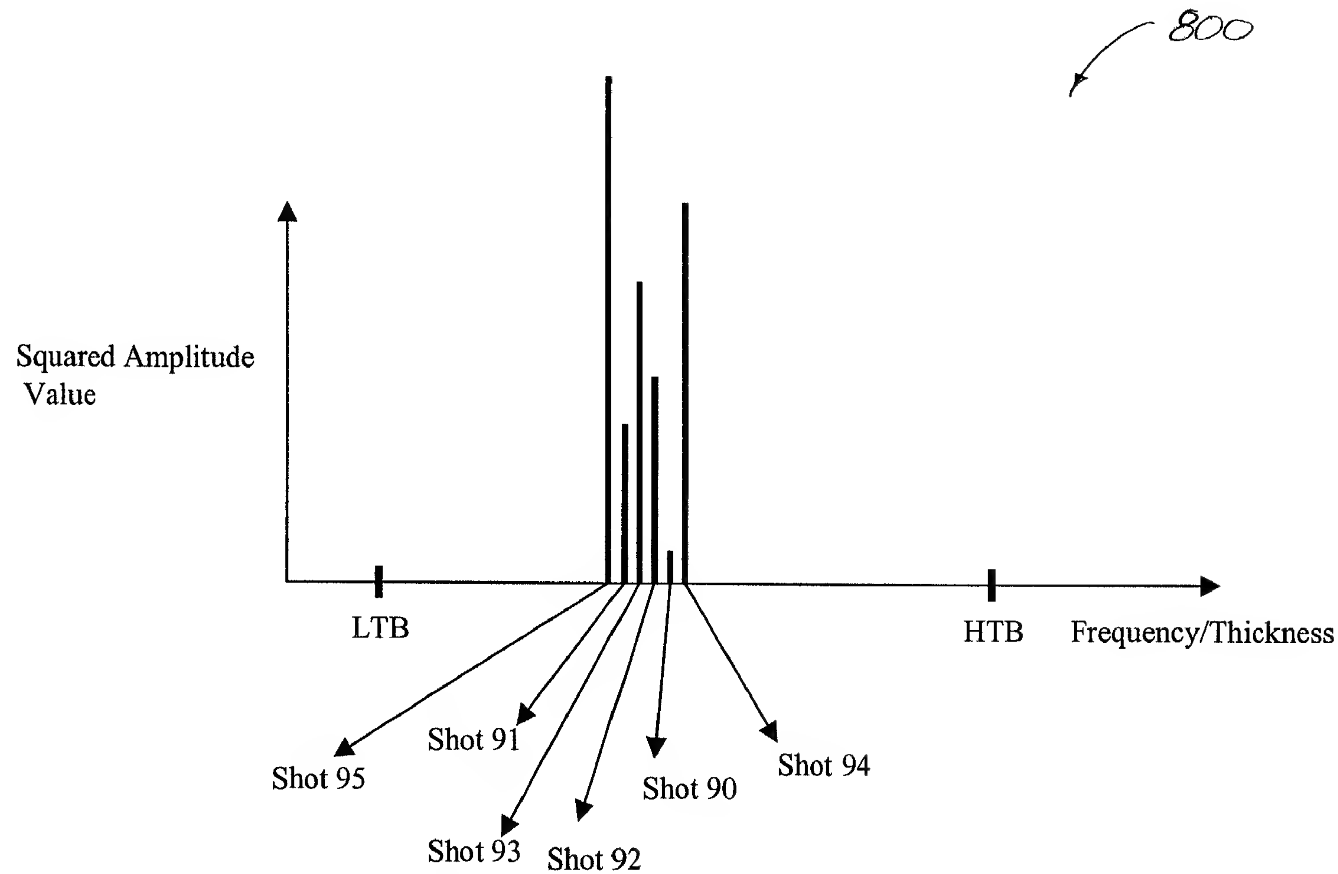

412
602
Form Data Matrix
602a
$x_1 x_2 \ldots\ldots x_M$
$x_2 x_3 \ldots\ldots$
$x_3 \ldots\ldots$
$x_{N-M} \ldots\ldots x_{N-1}$
$x_0, x_1, \ldots x_N$ Pixel values of spectrum
M >> K
604
$SVD: X = U_k \Sigma_k V_k$
Set the singular values
$\lambda_k, k = K+1, \ldots, M$ to Zero
606
Evaluate Signal Poles, z_k, k = 1,…,K
$z_k = \exp[(\alpha_k + i2\pi\upsilon_k)\Delta t]$
1)Calculate Linear Prediction Coefficients,
2) Root Polynomial
3) Select K roots with absolute value greater than or equal to 1 (outside unit circle in complex plane)
608
Evaluate Complex amplitudes, C_k, k = 1,…,K
Fit data to the set of equations
$x_n = \sum_{k=1}^{K} C_K z_k^{n-1}; 1 \le n \le N$
Using Cholesky decomposition
$C_k, v_k; k = 1, .., K$

Fig. 6



Roots of Polynomial on the complex plane

Fig. 7



Time Evolution from shot 90 to 95 for one frequency component

Fig. 8

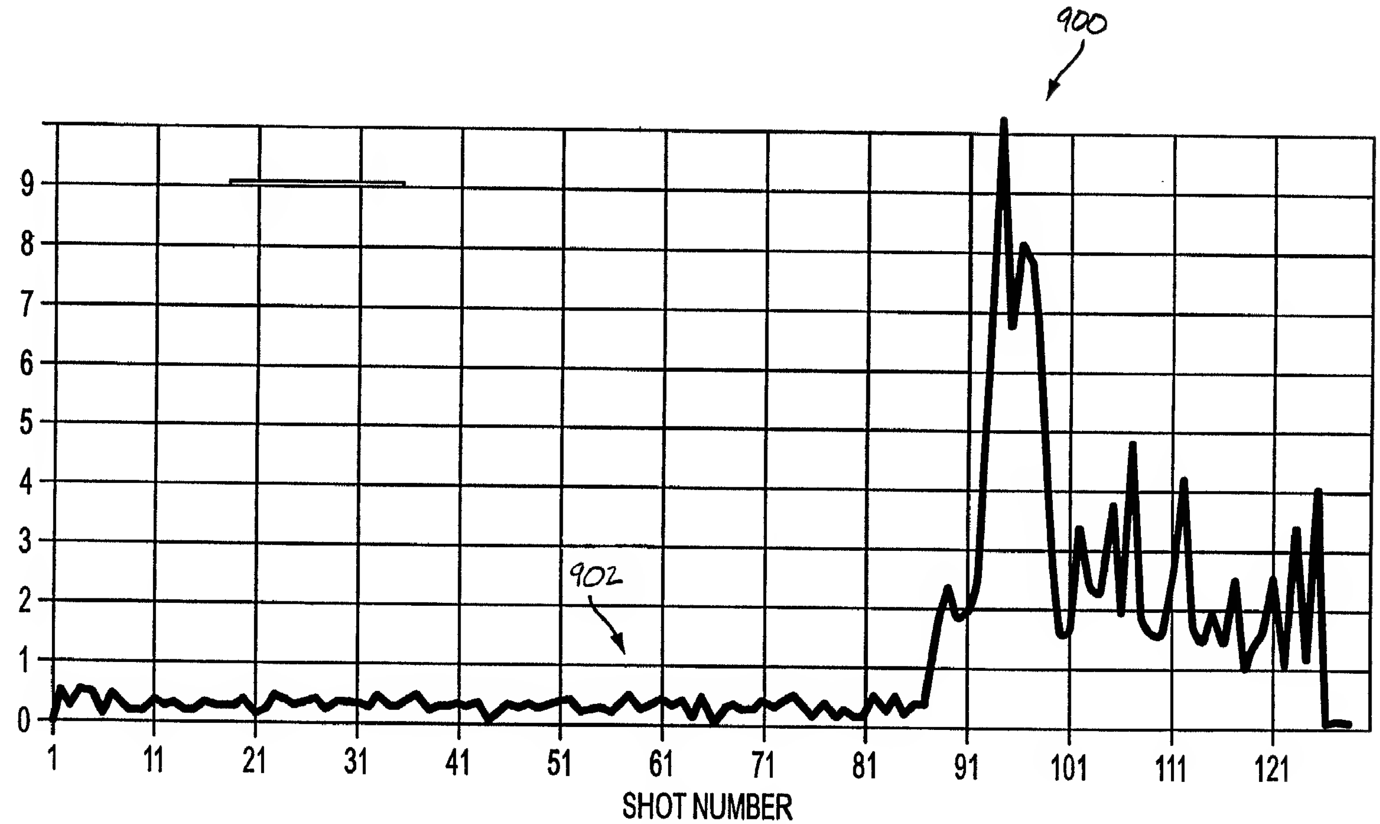

900
9
8
7
6
5
4
3
2
1
0
902
1
11
21
31
41
51
61
71
81
91
101
111
121
SHOT NUMBER

Fig 9